US005768416A

United States Patent [19]

Lech et al.

[11] Patent Number: 5,768,416

[45] Date of Patent: Jun. 16, 1998

[54] **INFORMATION PROCESSING METHODOLOGY**

[75] Inventors: **Robert Lech**, Jackson; **Mitchell A. Medina**, Essex Fells; **Catherine B. Elias**, Plainsboro, all of N.J.

[73] Assignee: **Millennium L.P.**, Grand Cayman, Cayman Islands

[21] Appl. No.: **487,150**

[22] Filed: **Jun. 7, 1995**

Related U.S. Application Data

[62] Division of Ser. No. 348,224, Nov. 28, 1994, Pat. No. 5,625,465, which is a continuation of Ser. No. 143,135, Oct. 29, 1993, Pat. No. 5,369,508, which is a continuation of Ser. No. 672,865, Mar. 20, 1991, Pat. No. 5,258,855.

[51] **Int. Cl.**[6] **G06F 15/40**

[52] **U.S. Cl.** **382/180**; 382/175

[58] **Field of Search** 395/148, 149; 382/287, 175, 306, 177, 180, 282, 317

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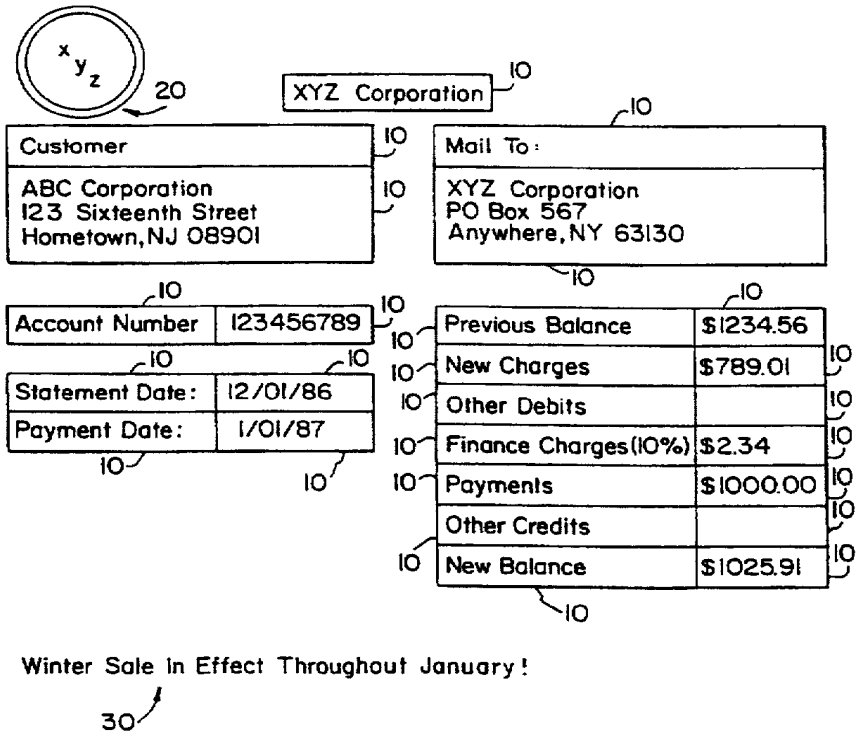
Primary Examiner—Edward L. Coles, Sr.
Assistant Examiner—Stephen Brinich
Attorney, Agent, or Firm—Foley & Lardner

[57] **ABSTRACT**

An information processing methodology gives rise to an application program interface which includes an automated digitizing unit, such as a scanner, which inputs information from a diversity of hard copy documents and stores information from the hard copy documents into a memory as stored document information. Portions of the stored document information are selected in accordance with content instructions which designate portions of the stored document information required by a particular application program. The selected stored document information is then placed into the transmission format required by a particular application program in accordance with transmission format instructions. After the information has been transmission formatted, the information is transmitted to the application program. In one operational mode, the interface interactively prompts the user to identify, on a display, portions of the hard copy documents containing information used in application programs or for storage.

66 Claims, 15 Drawing Sheets



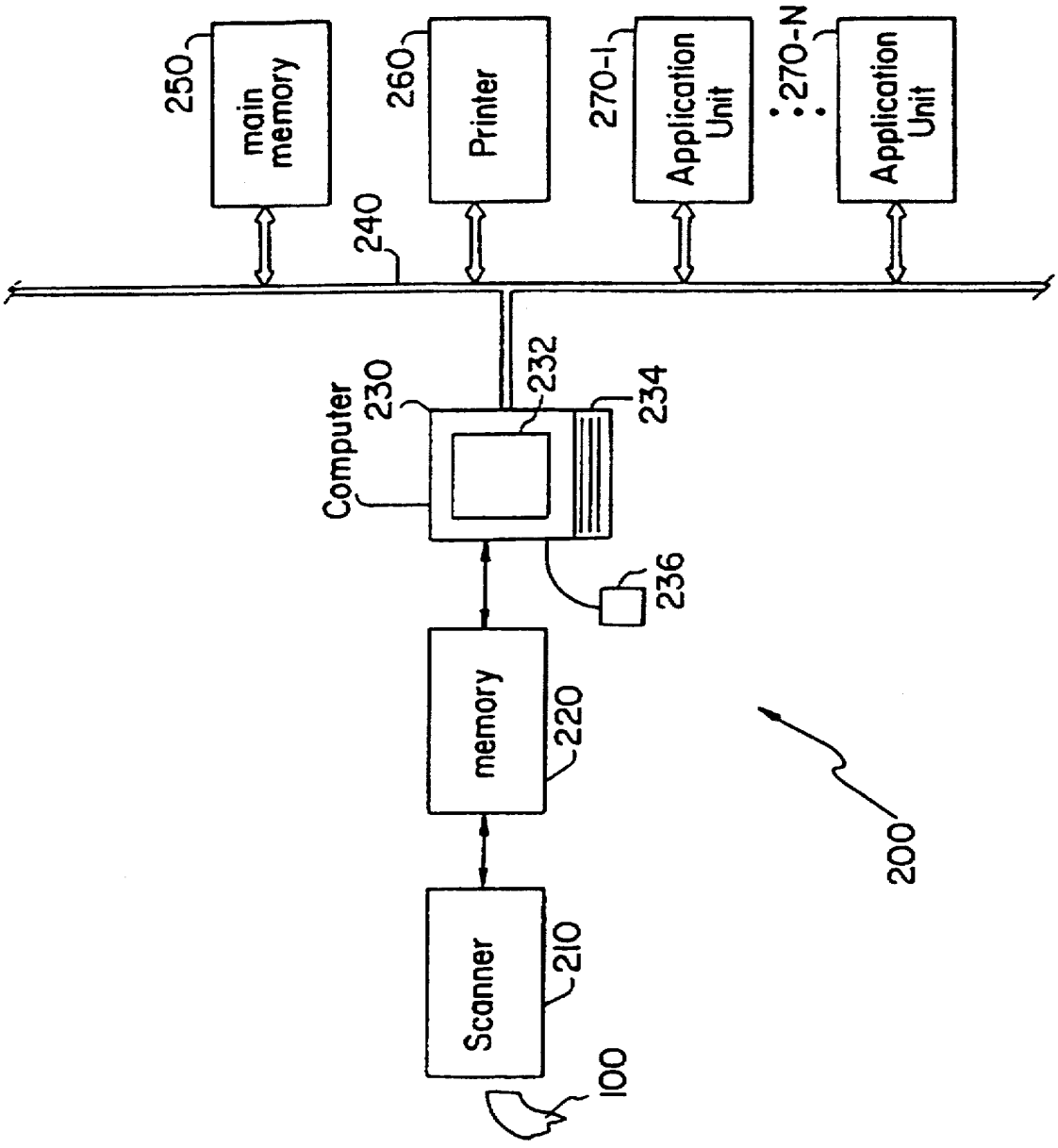

250
main memory
260
Printer
270-1
Application Unit
270-N
Application Unit
240
232
234
Computer
230
236
memory
220
200
Scanner
210
100

FIG. 1

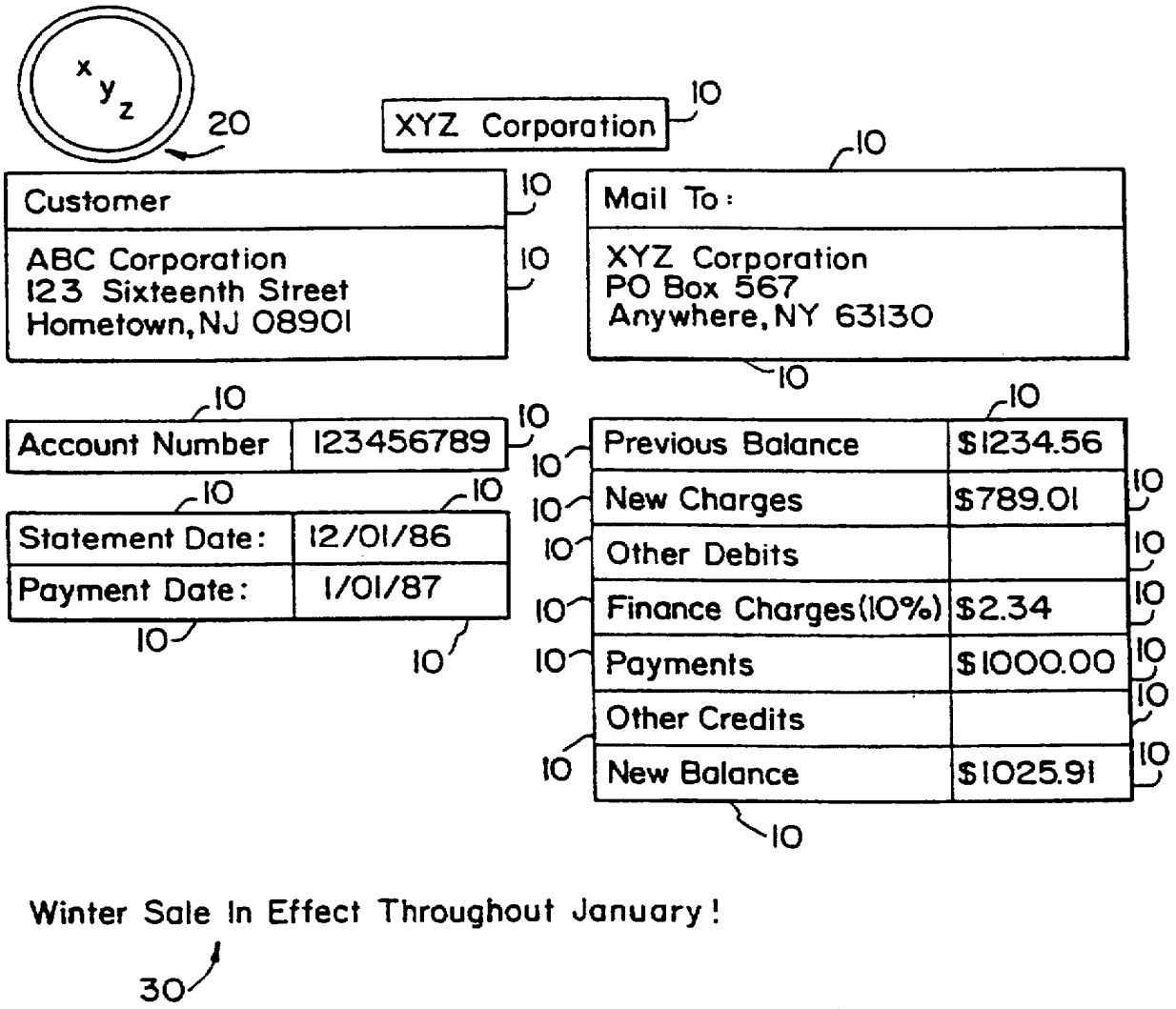

x y z
20
XYZ Corporation
10
Customer
ABC Corporation
123 Sixteenth Street
Hometown, NJ 08901
Mail To:
XYZ Corporation
PO Box 567
Anywhere, NY 63130
Account Number
123456789
Statement Date:
12/01/86
Payment Date:
1/01/87
Previous Balance
$1234.56
New Charges
$789.01
Other Debits
Finance Charges(10%)
$2.34
Payments
$1000.00
Other Credits
New Balance
$1025.91
Winter Sale In Effect Throughout January!
30

FIG. 2

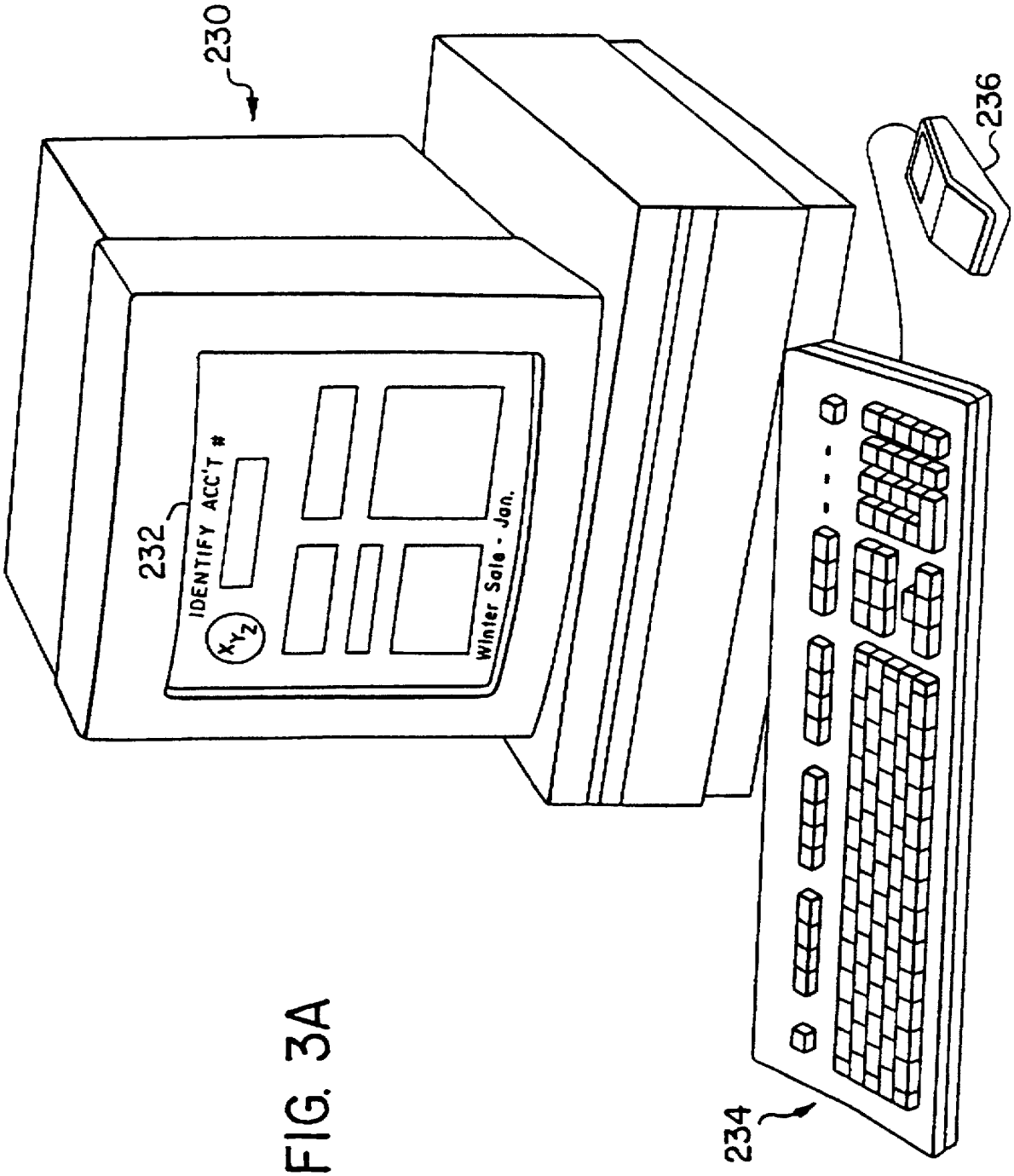


FIG. 3A

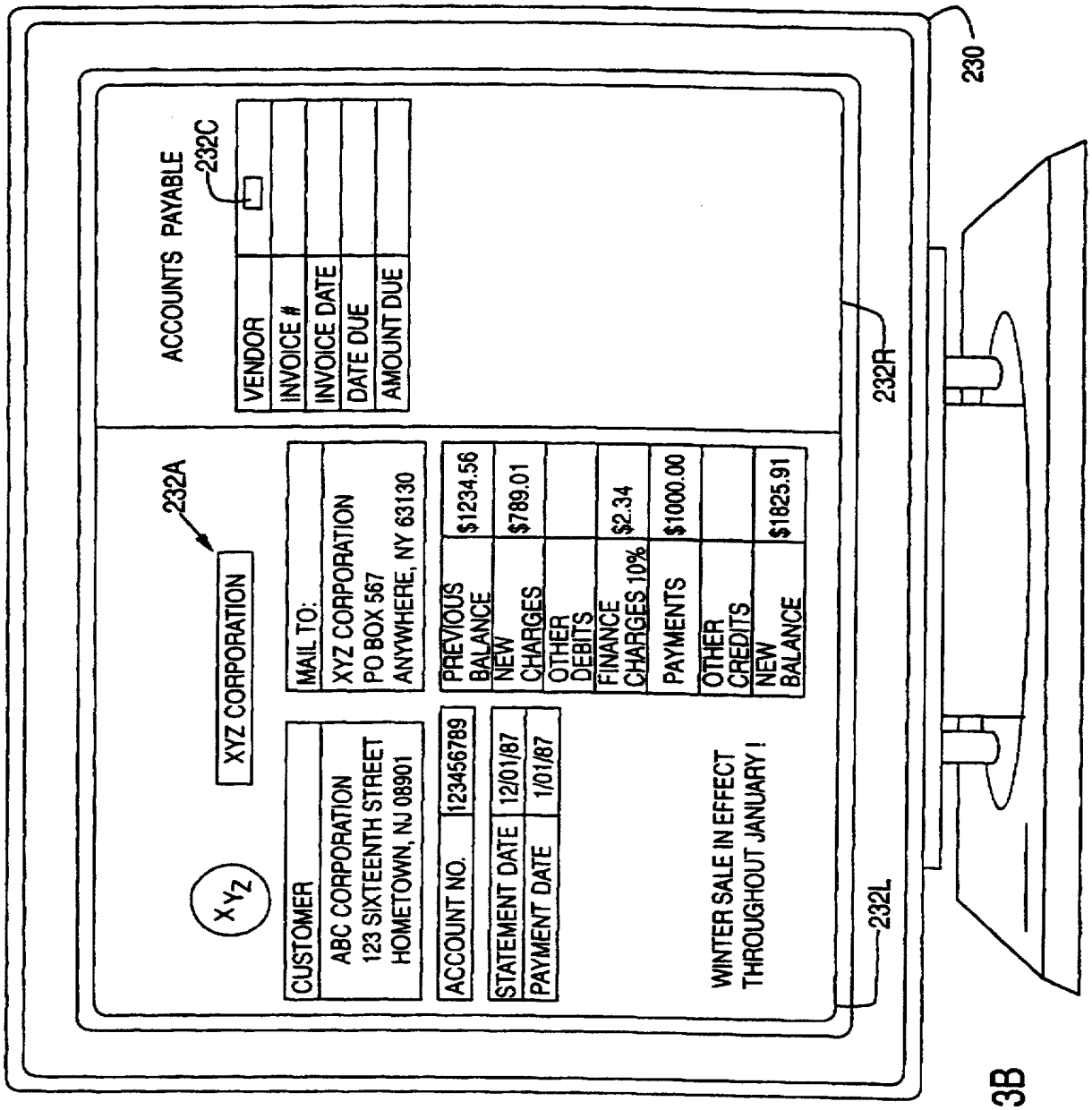

230
232R
232L
232A
232C
ACCOUNTS PAYABLE
VENDOR
INVOICE #
INVOICE DATE
DATE DUE
AMOUNT DUE
XYZ CORPORATION
MAIL TO:
XYZ CORPORATION
PO BOX 567
ANYWHERE, NY 63130
CUSTOMER
ABC CORPORATION
123 SIXTEENTH STREET
HOMETOWN, NJ 08901
ACCOUNT NO. 123456789
STATEMENT DATE 12/01/87
PAYMENT DATE 1/01/87
PREVIOUS BALANCE $1234.56
NEW CHARGES $789.01
OTHER DEBITS
FINANCE CHARGES 10% $2.34
PAYMENTS $1000.00
OTHER CREDITS
NEW BALANCE $1825.91
WINTER SALE IN EFFECT
THROUGHOUT JANUARY !

FIG. 3B

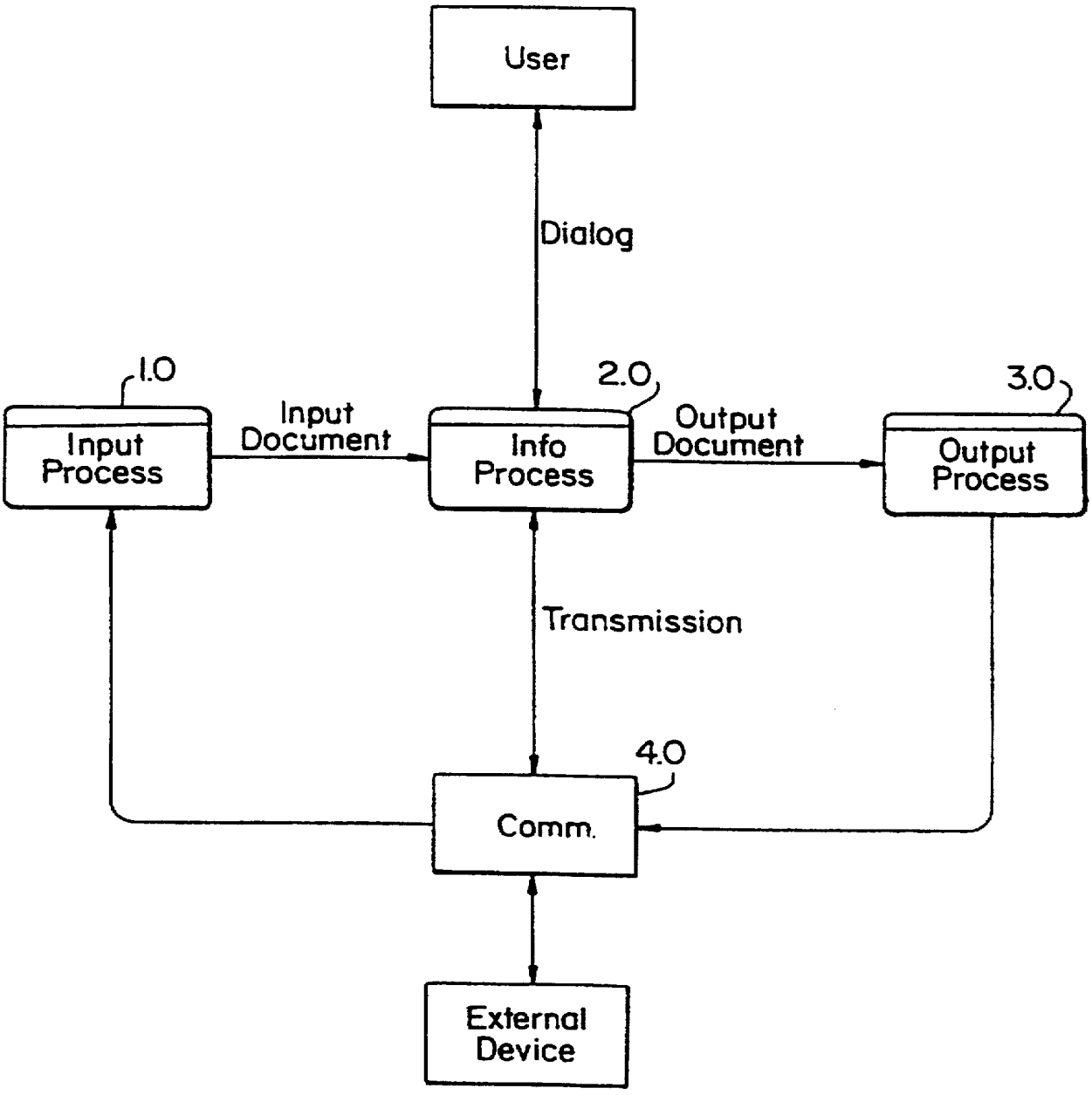

User
Dialog
1.0
Input Process
Input Document
2.0
Info Process
Output Document
3.0
Output Process
Transmission
4.0
Comm.
External Device

FIG. 4

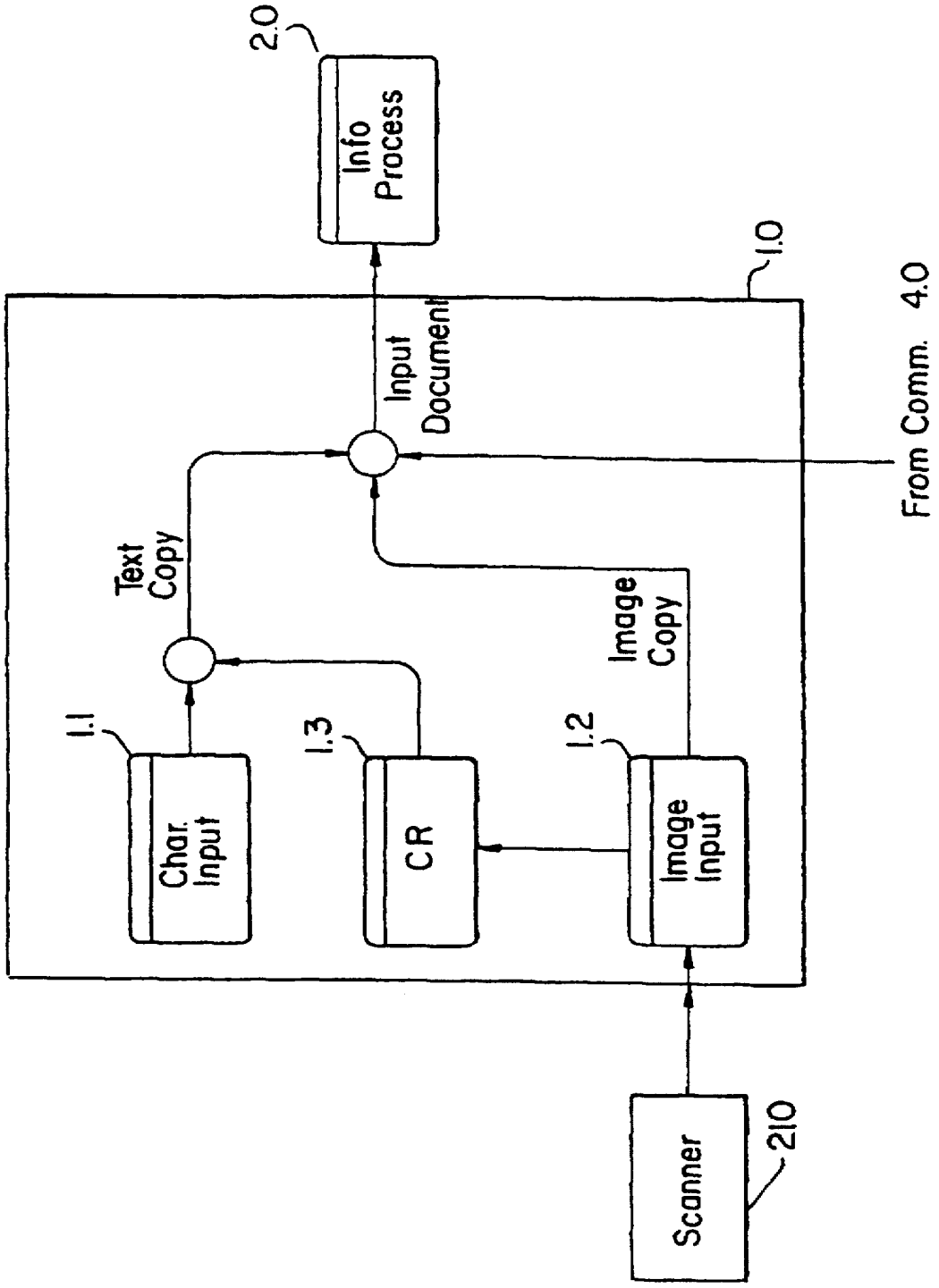

2.0
Info Process
1.0
Input Document
From Comm. 4.0
Text Copy
Image Copy
1.1
Char. Input
1.3
CR
1.2
Image Input
Scanner
210

FIG. 5

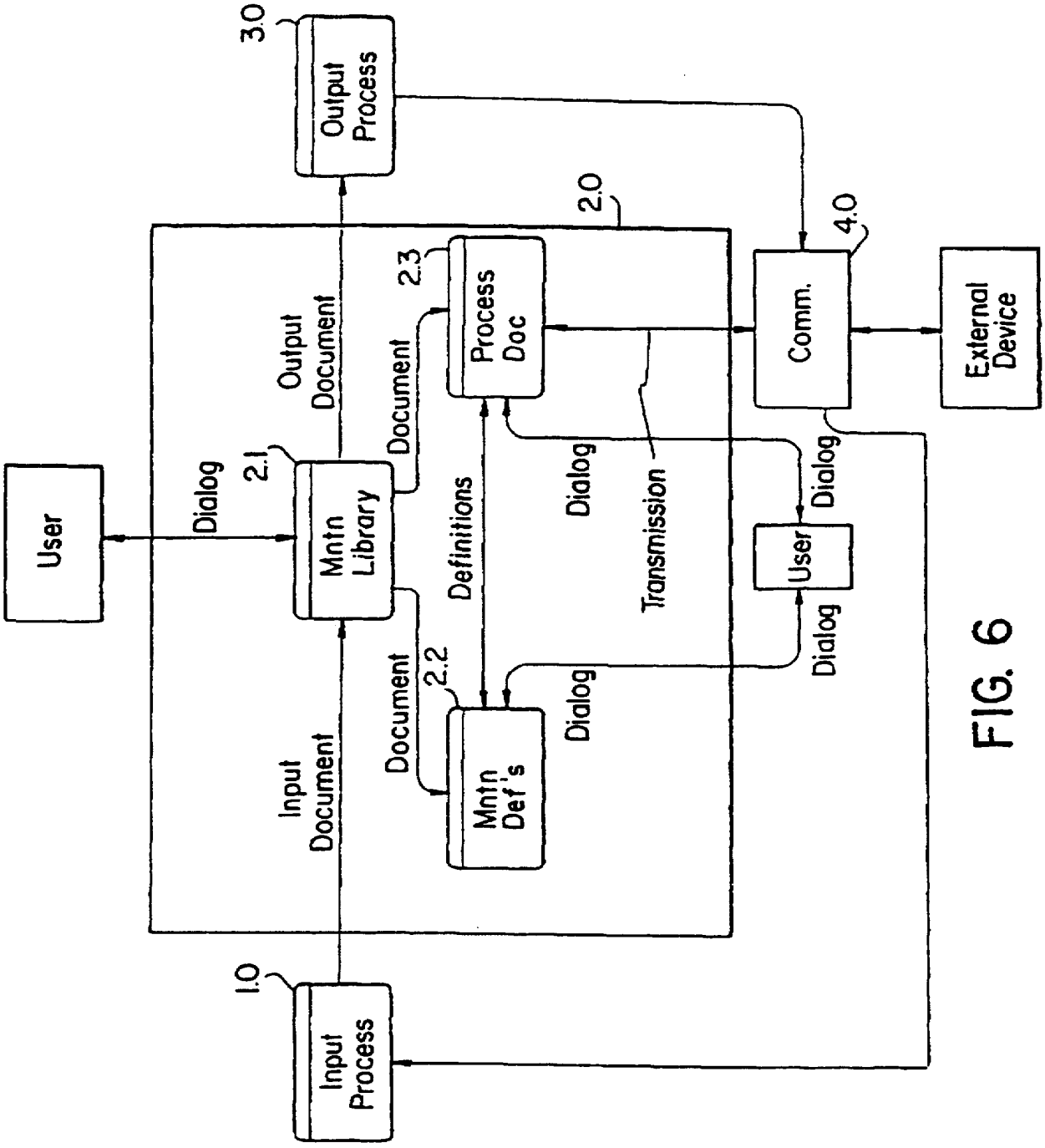

3.0
Output Process
2.0
4.0
2.3
Process Doc
Comm.
External Device
Output Document
Document
Dialog
2.1
Mntn Library
Definitions
Dialog
Transmission
User
Dialog
User
Dialog
Document
2.2
Mntn Def's
Dialog
Input Document
1.0
Input Process

FIG. 6

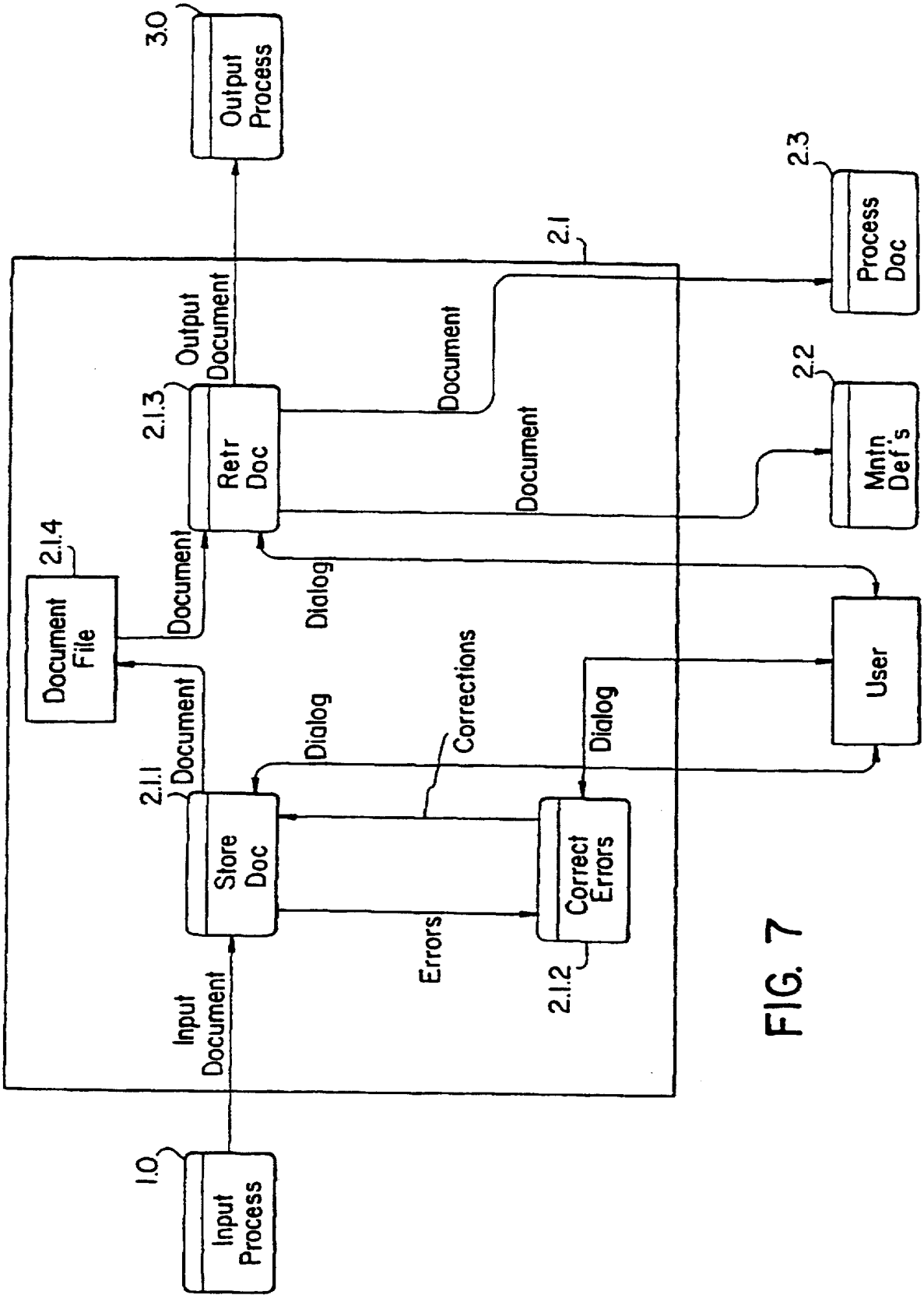

3.0
Output Process
2.3
Process Doc
2.1
Output Document
Document
2.1.3
Retr Doc
Document
2.2
Mntn Def's
2.1.4
Document File
Document
Dialog
User
Dialog
Corrections
Dialog
2.1.1
Document
Store Doc
Correct Errors
Errors
2.1.2
Input Document
1.0
Input Process

FIG. 7

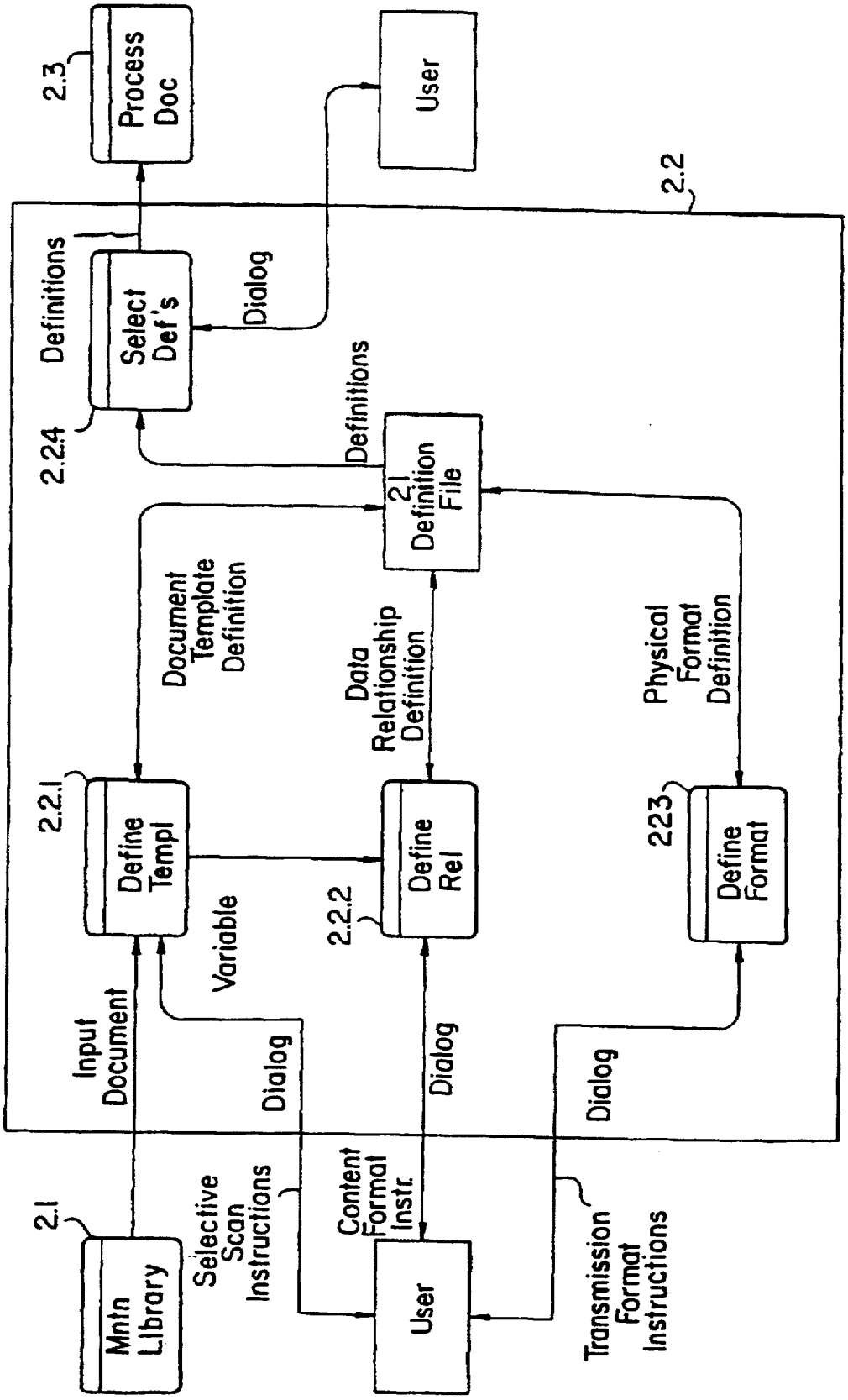

2.3
Process Doc
User
2.2
Definitions
Select Def's
Dialog
2.24
Definitions
2.1 Definition File
Document Template Definition
Data Relationship Definition
Physical Format Definition
2.2.1
Define Templ
2.2.2
Define Rel
223
Define Format
Variable
Input Document
Dialog
Dialog
Dialog
2.1
Mntn Library
Selective Scan Instructions
Content Format Instr.
User
Transmission Format Instructions

FIG. 8

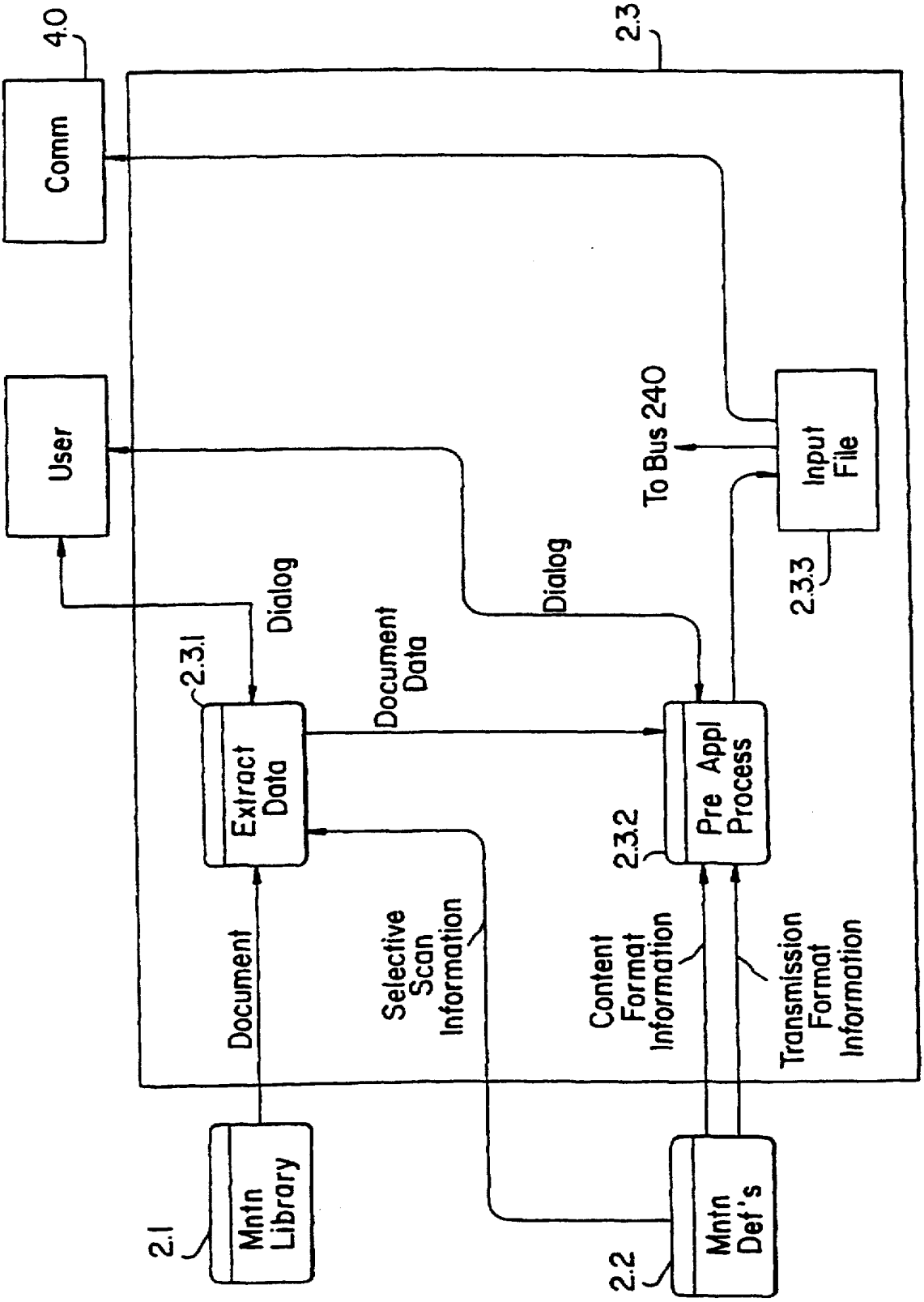

4.0
Comm
2.3
User
To Bus 240
Input File
2.33
Dialog
Dialog
2.31
Document Data
Extract Data
Pre Appl Process
2.32
Selective Scan Information
Content Format Information
Transmission Format Information
Document
Mntn Library
2.1
Mntn Def's
2.2

FIG. 9

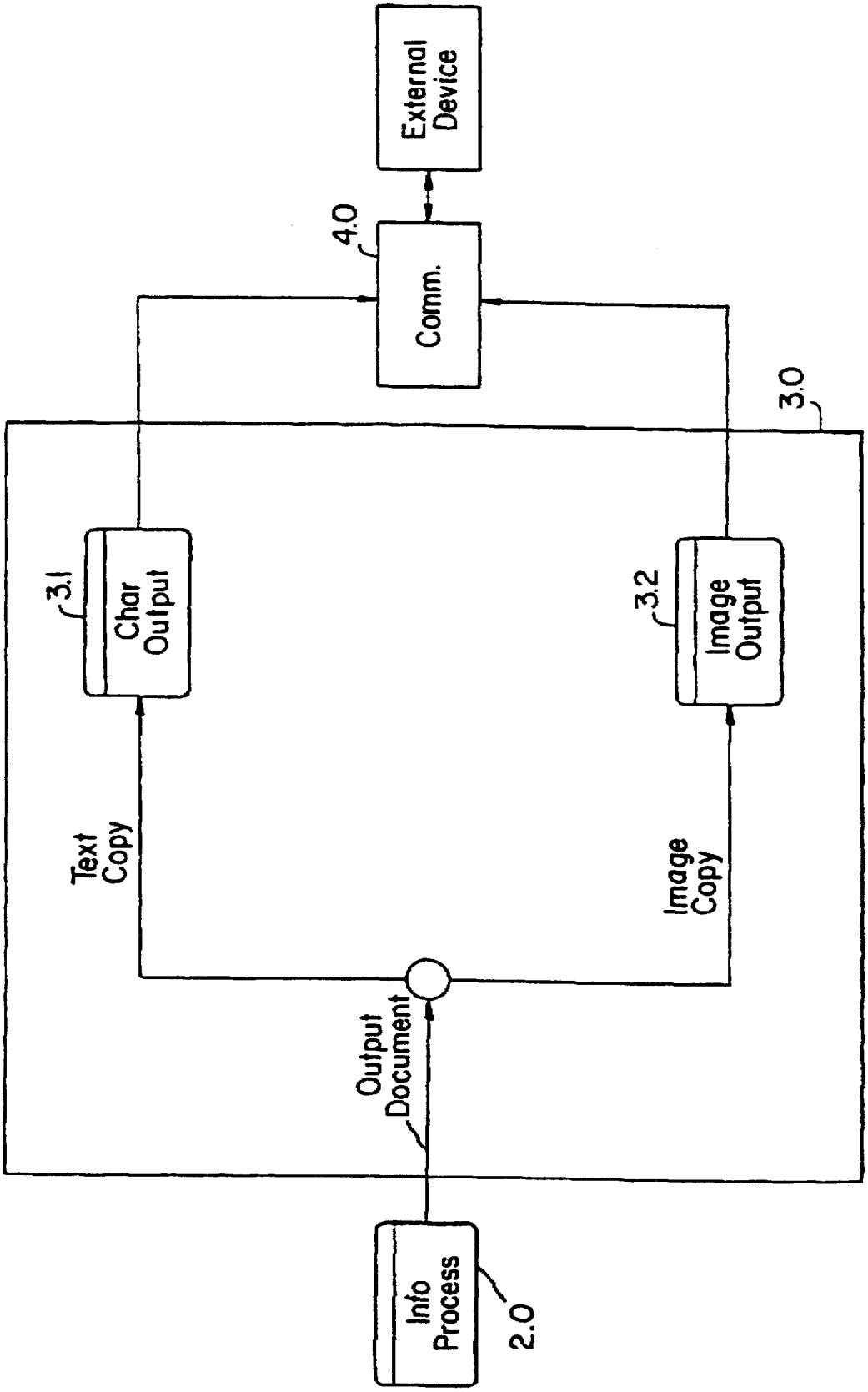

External Device
4.0
Comm.
3.0
3.1
Char Output
3.2
Image Output
Text Copy
Image Copy
Output Document
Info Process
2.0

FIG. 10

FIG. 11

Variable Name	Value
Vendor	XYZ Corporation
Heading 2	2
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Account Number	123456789
Statement Date	12/01/86
Payment Date	1/01/87
Previous Balance	$1234.56
New Charges	$789.01
Debits	
Finance Charges	$2.34
Payments	$1000.00
Other Credits	
New Balance	$1025.91

FIG. 12A

Variable Name	Value
Vendor	XYZ Corporation
Account Number	123456789
Statement Date	12/01/86
Payment Date	1/01/87
Previous Balance	$1234.56
New Charges	$789.01
Debits	
Finance Charges	$2.34
Payments	$1000.00
New Balance	$1025.91

FIG. 12B

Variable Name	Value
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Previous Balance	$1234.56

FIG. 12C

Variable Name	Value
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Previous Balance	$1234.56

FIG.13A

```
> 1 > 1 >1 > "XYZ Corporation"
> 2 > 2 > 25 >+ 123456789 >
> 3 > 2 > 1 > D12 / 01 / 86 >
> 4 > 2 > 11 > D12 / 15 / 86 >
> 5 > 2 > 21 > D01 / 01 / 87 >
> 6 > 10 > 25 > $1234.56 >
> 7 > 11 > 25 > $789.01 >
> 8 > 13 > 25 > $2.34 >
> 9 > 14 > 25 > $1000.00 >
> 10 >16 > 25 > $1025.91 >
```

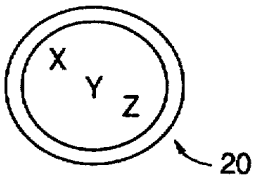
FIG.13B

```
> 1 > 1 >1 > $1234.56 >
> 2 > 2 > 1 > "XYZ Corporation"
> 3 > 3 > 1 > "PO Box 567"
> 4 > 4 > 1 > "Anywhere, NY  63130"
```

FIG.13C

```
/ 1 / 1 /1 / $1234.56 / /
/ 2 / 2 / 1 / *XYZ Corporation*
/ 3 / 3 / 1 / *PO Box 567*
/ 4 / 4 / 1 / *Anywhere, NY  63130*
```

FIG. 14



XYZ Corporation

Customer

ABC Corporation
123 Sixteenth Street
Hometown, NJ 88981

Mail To:

△ XYZ Corporation
PO Box 567
Anywhere, NY 63130 △

Account Number 123456789

Statement Date: ○ 12/01/86 ○

Payment Date: 1/01/87

Previous Balance	$1234.56
New Charges	□ $789.01 □
Other Debits	
Finance Charges (10%)	$2.34
Payments	$1000.00
Other Credits	
New Balance	$1025.91

WINTER SALE IN EFFECT THROUGHOUT JANUARY:

30

INFORMATION PROCESSING METHODOLOGY

This application is a divisional of application Ser. No. 08/348,224, filed Nov. 28, 1994, now U.S. Pat. No. 5,625,465, in turn a continuation application of Ser. No. 08/143,135, filed Oct. 29, 1993, now U.S. Pat. No. 5,369,508, and which is in turn a continuation of application Ser. No. 07/672,865, filed Mar. 20, 1991, now U.S. Pat. No. 5,258,855.

BACKGROUND OF THE INVENTION

The invention is directed to a system for efficiently processing information originating from hard copy documents. More specifically, the invention is directed to a hard copy document to application program interface which minimizes the need to manually process hard copy documents.

In the past, information contained on hard copy documents was manually entered into a computer via the input controller of a particular computer. The original document was then filed away for future reference. Automatic input of data was limited to the input of Magnetic Ink Character Recognition (MICR) data and to Optical Character Recognition (OCR) data. This fixed-position data was forwarded directly to a dedicated computer application specifically designed to accommodate the input format. In more recent years, typewritten text has been mechanically inputted into a computer via a text file. Examples of this latter type of system are word processors and photo-typesetters.

These conventional systems have limitations which decrease the efficiency of processing information from a hard copy document. For example, the systems discussed above are limited in their application to MICR, OCR, or typewritten data. Parsing and processing data is limited to the particular requirements of the particular computer application which requires the input data. In addition, in these conventional systems, the actual hard copy document must be retained for future reference at great expense.

In a sophisticated computer network, different users may require different portions of the information contained on a hard copy document. For example, if the hard copy document is an invoice returned with payment of a bill, the accounting department may need all of the monetary information contained on the bill while the mailroom may need only customer address information, to update a customer's address. Therefore, there is a need for a system in which specific information from a hard copy document can be selectively distributed to various users.

Another problem with conventional systems is that users, even within the same company, may require that the information extracted from a hard copy document be transmitted to a particular application program in a specific transmission format. For example, one department in a company may use a particular application program which must receive information using a particular character as a delimiter and other departments may require the information in a different format using different delimiters.

Another problem, particularly for small businesses, is that current systems can not efficiently accommodate the inputting of information from a diversity of hard copy documents. A large business which receives many forms in the same format can afford a system which inputs a high volume of information in that format into memory. For example, it is cost-effective for a bank which processes hundreds of thousands of checks a month to buy a dedicated machine which

can read information off of checks having a rigidly defined, or fixed, format. However, as the diversity of forms received by a business increases relative to the number of forms that must be processed, it becomes less cost-effective to design a dedicated machine for processing each type of form format. This problem is particularly significant in small businesses which may, for example, receive fifty invoices a month, all in different, non-fixed, formats. It is frequently not cost-effective for a small business to design dedicated systems for inputting information in each of these various formats. This leaves a small business with no other practical alternative than to manually input the information off of each invoice each month.

SUMMARY OF THE INVENTION

It is an object of the invention, therefore, to provide an application program interface which allows a user to select specific portions of information extracted from a diversity of hard copy documents and allows the user to direct portions of this information to several different users in accordance with the needs of the particular user.

It is also an object of the invention to provide a cost-effective system for inputting hard copy documents which can accommodate hard copy documents in a diversity of formats.

It is another object of the invention to provide an application program interface which allows a user to put information, which is to be transmitted, into a particular transmission format, based upon the needs of the receiver of the information.

It is a further object of the invention to provide an application program interface which will allow the extraction, selection, formatting, routing, and storage of information from a hard copy document in a comprehensive manner such that the hard copy document itself need not be retained.

It is another object of the invention to provide a system which reduces the amount of manual labor required to process information originating from a hard copy document.

A further object of the invention is to reduce the time required to process information originating from a hard copy document so that a higher volume of transactions involving hard copy documents can be processed.

The invention provides an application program interface which inputs a diversity of hard copy documents using an automated digitizing unit and which stores information from the hard copy documents in a memory as stored document information. Portions of the stored document information are selected in accordance with content instructions which define portions of the stored document information required by a particular application unit. Selected stored document information is then formatted into the transmission format used by the particular application program based on transmission format instructions. The transmission formatted selected stored document information is then transmitted to the particular application program. The hard copy documents may contain textual information or image information or both.

The interface operates in three different modes.

In a first mode, the interface extracts all of the information from hard copy documents and stores this information in memory. Parsing of various portions of the extracted information is performed in accordance with content instructions.

In a second mode, the user operates interactively with the interface by use of a display and an input device, such as a

mouse. In this second mode, a hard copy document is inputted and displayed on the display. The interface then prompts the user to identify the location of various information. For example, the nterface can ask the user to identify the location of address information on the hard copy document. In response, the user positions the mouse to identify address information using a cursor. The identified information is then stored as address information in memory. Subsequently, the interface again prompts the user to identify other pieces of information, which are then stored in the appropriate locations in memory. This process proceeds until all of the information which is desired to be extracted off of the hard copy document is stored in memory.

In a third mode of operation, selected portions of information are extracted off of hard copy documents in accordance with predetermined location information which has been specified by the user. For example, the user can define a template which specifies the location of information on hard copy documents. Templates can be formed in conjunction with second mode operation. Alternatively, the user can instruct the interface to search hard copy documents for a particular character or symbol, located on the hard copy documents. The information desired to be extracted off of the hard copy documents is specified relative to the location of this character or symbol.

The interface can also prompt or receive from an applications program or another information processing system, required information, content instructions, and format instructions.

Other objects, features, and advantages of the invention will be apparent from the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in further detail below with reference to the accompanying drawings, in which:

FIG. **1** illustrates hardware for implementing a preferred embodiment of the instant invention;

FIG. **2** illustrates an example of a hard copy document containing information to be processed by the instant invention;

FIGS. **3A** and **3B** are enlarged views of the computer of FIG. **1** used to explain how the invention interactively prompts a user to identify information;

FIG. **4** is an overall data flow diagram for the FIG. **1** preferred embodiment;

FIG. **5** is a detailed input data flow diagram for the FIG. **1** preferred embodiment;

FIG. **6** is a detailed information processing data flow diagram for the FIG. **1** preferred embodiment;

FIG. **7** is a more detailed information processing data flow diagram for the maintain library module of FIG. **6**;

FIG. **8** is a more detailed information processing data flow diagram for the maintain definitions module of FIG. **6**;

FIG. **9** is a more detailed information processing data flow diagram for the process document module of FIG. **6**;

FIG. **10** is a detailed output data flow diagram for the FIG. **1** preferred embodiment;

FIG. **11** lists data corresponding to the hard copy document of FIG. **2**;

FIGS. **12A**, **12B**, and **12C** illustrate examples of data which can be selected from the extracted data of FIG. **11** in accordance with content instructions;

FIGS. **13A**, **13B**, and **13C** illustrate examples of the data of FIGS. **12A**, **12B**, and **12C** formatted in accordance with various transmission format instructions to form input files; and

FIG. **14** illustrates another example of a hard copy document containing information to be processed by the instant invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hardware

The invention provides an interface between information originating from a hard copy document and a computer application unit which uses the information. The computer application unit can be a particular computer application program or a device which is controlled in accordance with instructions or information from the hard copy document. The invention also allows storing a copy of the hard copy document in a memory and retrieving the copy of the hard copy document. By providing a comprehensive and integrated system which can accommodate almost all of the possible uses of information contained on a hard copy document, the instant invention allows for a paperless office.

The invention includes hardware and software necessary to extract, retrieve, and process information from the hard copy document. A copy of the actual image of the hard copy document is stored in memory. Textual information extracted from the hard copy document is also stored in memory. Textual information is information, such as alphanumeric characters, which is recognized on the hard copy document and which is stored in a form which corresponds to the particular recognized character. For example, the extracted characters can be stored in the ASCII format in an electronic memory.

The user can have all of the information extracted from the hard copy document and stored in memory. Alternatively, the interface can interactively prompt the user to identify specific pieces of information for storage. The interface can also extract specific pieces of information using a predefined template. The interface can also prompt or receive from another information processing system or an applications program desired information, content instructions, and format instructions.

The instant invention also provides for parsing information extracted from the hard copy document and for directing this parsed information to specific users or application programs as an input file.

The invention also permits the user to define the transmission format of the input file for a particular computer application unit.

FIG. **1** illustrates hardware for implementing a preferred embodiment of a hard copy document to application program interface according to the instant invention. The interface **200** processes information extracted off of hard copy document **100** and provides information to application units **270** in a form required by each particular application unit. The interface extracts information off of a hard copy document **100** utilizing a scanner **210**. The scanner **210** can be any type of scanner which extracts information off of hard copy documents, for example, an optical Reader.

The scanned information is stored in a scanner memory **220** or in main memory **250**, as will be described in greater detail below. If main memory **250** or another memory is available to store the scanned information, then scanner memory **220** can be omitted.

The information from scanner memory **220** or main memory **250** is transmitted to computer **230**. In the preferred embodiment, computer **230** includes a display **232**, a keyboard **234**, and a mouse **236**. The display **232** displays an

image of the hard copy document itself and/or information necessary to process the information extracted off of the hard copy document.

The computer **230** is used to select portions of the stored document information contained in memory in accordance with content instructions which define portions of the stored document information required by an application unit. These content instructions may be provided by the application program. Alternatively, the content instructions can be inputted via an input device such as a keyboard, a touch screen, a mouse, a notepad, a voice recognition device, or the like.

The computer **230** is also used to format selected stored document information into the transmission format used by an application unit based on transmission format instructions. The transmission format instructions may be provided by the application program. Alternatively, the transmission format instructions can be inputted via a keyboard, a touch screen, a mouse, a notepad, a voice recognition device, or the like.

Thus, the computer **230** is used to generate an input file for a particular application unit. The computer **230** is connected to scanner memory **220**, main, or permanent, memory **250**, a printer **260**, and application units **270**, via a bus **240**. Although FIG. **1** illustrates use of a bus to connect components together, it is understood that any routing or connecting link, implemented in hardware or software or both, can be employed instead of, or in addition to, a bus. Instructions to or in the computer **230** control the main memory **250**, the printer **260**, the application units **270**, and the bus **240**. Instructions to or in computer **230** can also control exchanges of information with scanner memory **220**.

When the computer **230** generates an input file for a particular document, the computer **230** can send this input file directly to an application unit or can store this input file in the main memory **250** until required by an application unit. The main memory **250** may also optionally store a copy of the image information for the hard copy document and the textual information for the hard copy document. Thus, the image information and textual information from the hard copy document can be retrieved and printed out on printer **260**. In addition, image and textual information stored in scanner memory **220** or in main memory **250** can be used to form additional input files at the time of input or at a later time, based on content instructions and transmission format instructions. Thus, the invention can, at the discretion of the user, eliminate the need to retain copies of hard copy documents, permitting a paperless office.

The application units **270** include particular application programs and devices which are controlled in accordance with information contained on hard copy document **100**.

FIG. **2** illustrates an example of a hard copy document **100** which contains information to be processed by the instant invention. The document illustrated in FIG. **2** is a bill from XYZ Corporation to customer ABC Corporation. FIG. **2** is only an example of a type of document that can be processed by the instant invention.

In a first operational mbde, the scanner **210** stores all of the information extracted off of hard copy document **100** in the scanner memory **220** or, alternatively, in main memory **250**. The extracted information is stored in two forms. The actual image of the hard copy document **100** is stored as image information in the scanner memory **220**. In addition, the scanner memory **220** stores textual information recognized on the hard copy document **100** by, for example, employing standard character recognition software. In the preferred embodiment, the textual information is stored in ASCII format. The scanner memory **220** can be, for example, an electronic, magnetic, or optical memory.

FIG. **3A** illustrates an enlarged view of the computer **230** of FIG. **1**. This view will be used to describe a second mode of operation. In this second mode of operation, the hard copy document **100** is scanned and a copy of the document **100** is displayed on display **232** of computer **230**, based on the contents of information temporarily stored in scanner memory **220**. After the document is displayed on display **232**, the computer **230** interactively prompts the user to identify the location of specific pieces of information on the hard copy document. In the FIG. **3A** illustration, this prompt message is indicated as the message beginning with the arrow.

For example, the prompt message can ask the user to identify the location of account number information on the hard copy document. The user then uses an input device, such as keyboard **234** or mouse **236** or a touch screen, notepad, voice recognition device, or other input device to position a cursor on the display to identify the location of the information requested by the prompt message. For example, the cursor could be used to define a block (which could be highlighted) containing the requested information, followed by a mouse "enter" click. In this example, the user would move the mouse to identify the location of the account number information contained on the hard copy document **100**. The computer **230** then stores the information which has been identified by the user as account number information in the appropriate address or subfile or as the appropriate variable or parameter, or data field, in memory. The computer then prompts the user to identify the location of other information on the hard copy document, such as, statement date information. The process proceeds until all of the desired information has been stored into the appropriate locations in memory.

FIG. **3B** illustrates a variation of the second mode for interactively prompting the user for information. In FIG. **3B**, the display is split into two portions. A left-hand portion **232L** displays the image of the hard copy document and a right-hand portion **232R** displays the required application program information. For example, in FIG. **3B**, portion **232R** displays a spreadsheet used by an application program. While observing the split display, the user can input instructions to associate specific pieces of information on the hard copy document (for example, the vendor name indicated by the mouse arrow **232A**) with particular subfiles in memory (for example, the vendor field next to which the cursor **232C** appears), using a mouse or other input device(s) or both. The split display also allows the user to generate content format instructions while observing the information required for a particular application program on the right-hand portion.

These second modes of operation are efficient for small businesses which receive a small number of a wide variety of invoices, since the user does not necessarily have to store all of the information that appears on the hard copy document. A further advantage is that data input is quicker, easier, and more accurate than with previous keyboard methodology. In addition, by specifying the location on the hard copy document of information, the user may optionally create a template, to be described in further detail below, for each different type of invoice. This template is stored for future use when another hard copy document in the same format is received.

More specifically, instructions from computer **230** can direct the scanner **210** and scanner memory **220**, and/or main

memory **250**, to scan and/or store only specific portions of hard copy document **100**. After the interactive prompts required to obtain information for a desired application program, the unused information stored in scanner memory **220** or **250** can be erased. Further, scanning of a second identical document can be limited to only those portions of the document which contain needed information.

More specifically, in FIG. **2**, the lines **10** drawn around certain portions of the document represent the areas which the user has previously identified as the portions of a document to be extracted by the scanner **210** and stored in scanner memory **220** and/or main memory **250**. Since the logo **20** and the message **30** have not been identified as an area to be scanned and stored, these areas are not scanned and stored in subsequent documents. Since the user has previously associated each of the areas **10** with a specific subfile of information, e.g., the account number, the scanned information is stored in memory locations corresponding to that subf ile.

Data Processing

FIGS. **4–10** illustrate the flow of data in the FIG. **1** preferred embodiment. FIG. **4** illustrates the overall data flow for the FIG. **1** preferred embodiment. The preferred embodiment includes an input process module **1.0**, an information processing module **2.0**, and an output processing module **3.0**. The information processing module **2.0** is equipped to receive instructions from and transmit information to a user. The information processing module **2.0** can also transmit to and receive information from a remote external device through communication interface **4.0**. Input process module **1.0** and output processing module **3.0** can also access communication interface **4.0**. A module is implemented in hardware, software, or a combination of hardware and software. The specific implementation for a particular business application depends upon a variety of factors, for example, the relative costs of hardware and software implemented systems, the frequency with which a user will want to expand or modify the system, and the like.

FIG. **5** is a more detailed diagram of the input process module **1.0** of FIG. **4**. The input process module **1.0** includes a character input module **1.1**, an image input module **1.2**, and, in the preferred embodiment, a character recognition device **1.3**. The character input module inputs textual information, such as alphanumeric characters, from an input device such as keyboard **234**. The image input module **1.2** inputs image information, for example, a digitized image of the actual appearance of hard copy document **100**. Textual information can include textual input from an input device such as keyboard **234** and textual information extracted from the document by character recognition device **1.3**. Both types of information comprise an input document which is transmitted to information processing module **2.0**. In the FIG. **1** preferred embodiment, the processing performed by input process module **1.0** occurs in scanner memory **220**, computer **230**, and main memory **250**.

FIG. **6** illustrates information processing data flow for the FIG. **1** preferred embodiment, that is, FIG. **6** illustrates data flow in the information processing module **2.0**.

The information processing module **2.0** includes a maintain library module **2.1**, to be described in further detail below in conjunction with FIG. **7**, a maintain definitions module **2.2**, to be described in further detail below in conjunction with FIG. **8**, and a process document module **2.3** to be described in further detail below in conjunction with FIG. **9**.

The information processing module **2.0** is the module which coordinates and drives the entire system. In the preferred embodiment, the information processing module **2.0** is implemented primarily by computer **230**.

FIG. **7** illustrates information processing data flow in the maintain library module **2.1**. The maintain library module **2.1** maintains a library of imaae information, for example, a digitized image representing the actual appearance of the hard copy document, and textual information of the hard copy documents for reference during processing. This library can be incorporated within scanner memory **220**, main memory **250**, or another independent memory, for example, a RAM disk. The maintain library module **2.1** includes a store document module **2.1.1**, a correct errors module **2.1.2**., a retrieve document module **2.1.3**, and a document file **2.1.4**. These modules operate collectively to store, retrieve, and correct document information.

The store document module **2.1.1**, prior to routing the document to the document file **2.1.4**, may provide information on recognition errors which may have occurred while inputting the document. For example, the store document module **2.1.1** identifies that a character contained on hard copy document **100** was not recognized. The store document module **2.1.1** also optionally causes a copy of the document and its parsing to be displayed on the display **232** for confirmation by the user. The user may utilize this opportunity to identify any errors in the displayed document and, in conjunction with the correct errors module **2.1.2**, to revise the document's parsing, if necessary, prior to storage of the document in memory. The module **2.1.1** also provides a facility for the user to name a particular hard copy document for cataloging, storage, and retrieval purposes. After the document is named, the store document module **2.1.1** stores copies of the document in the document file **2.1.4**.

The correct errors module **2.1.2** processes instructions from the user to correct errors identified by the store document module **2.1.1** and errors that have been spotted by the user during the confirmation process.

The retrieve document module **2.1.3** permits the user to retrieve a copy of a document previously stored in the document file **2.1.4**. As described above, long-term storage is provided by main memory **250**, if necessary.

FIG. **8** illustrates a more detailed information processing data flow diagram for the maintain definitions module **2.2** of FIG. **6**. The maintain definitions module **2.2** allows the user to define system and document parameters and maintains the definitions of these system and document parameters. The maintain definitions module **2.2** includes a define template module **2.2.1** which allows the user to specify the location of information on the document. This information provided by the user defines a template which is used to extract information off the document and to associate the extracted information with a particular variable or subfile. These templates are illustrated by boxes **10** in the FIG. **2** example of a hard copy document. The maintain definitions module **2.2** can also access templates previously defined by the user and stored in main memory **250**. Templates can also be provided as part of software packages developed by program developers.

The maintain definitions module **2.2** also includes a define relationships module **2.2.2**. The define relationships module **2.2.2** allows the user to define data relationships, or logical relationships, between pieces of information extracted from the hard copy document. These pieces of information are then used to generate an input file for a selected computer application unit. The user defines these relationships by

content instructions. Alternatively, content instructions to define relationships can be provided by application software. If the user provides these content instructions, the content instructions are inputted via keyboard **234** or via another input device such as a notepad, a voice recognition device, or the like. Examples of content instructions, data, and logical relationships will be described in further detail in conjunction with FIGS. **11** and **12A**, **12B**, and **12C**.

The maintain definitions module **2.2** also includes a define format module **2.2.3**. The define format module **2.2.3** allows the user to define transmission formats for an input file which is then transmitted to a selected computer application unit. Selection of the transmission format of the. input file is accomplished by the user through use of transmission format instructions. Alternatively, the applications software itself can generate its own transmission format instructions. When the user must specify transmission format instructions, the transmission format instructions are inputted via keyboard **234** or via another input device such as a notepad, a voice recognition device, or the like. A further description of various transmission formats will be provided below in conjunction with FIGS. **12A**, **12B**, **12C**, **13A**, **13B**, and **13C**.

A select definitions module **2.2.4** is also included in the maintain definitions module **2.2**. The select definitions module **2.2.4** allows the user to store and select a set of definitions to be used for processing the document. The definitions identify pieces of information on the document by, for example, absolute location, variable location, or relative location, or by proximity to key words and/or symbols. These definitions are described in further detail below by way of an illustrative example.

FIG. **9** illustrates a more detailed information processing data flow diagram for the process document module **2.3**. The process document is module **2.3** processes the document after the document has been stored in the system. The process document module **2.3** gathers the appropriate information which has been stored, and creates input file(s) **2.3.3** for the selected application unit. The process document module **2.3** then transmits the input file(s) via bus **240** and/or communication interface **4.0** to an application unit **270**, an output device such as printer **260**, or to main memory **250**.

The process document module **2.3** includes an extract data module **2.3.1**. This module extracts data off of the document in accordance with the user's instructions, for example, the user-defined template, or through the interactive mode.

The process document module **2.3** also includes a preapplication process module **2.3.2** which gathers and associates information extracted from the document in accordance with content instructions. This module prompts the user for any additional information required to satisfy the relationships defined by the content instructions. The preapplication process module **2.3.2** also places the selected information into the Transmission format defined by the transmission format instructions.

The preapplication process module **2.3.2** also generates the input file **2.3.3** for the selected application in accordance with the appropriate instructions. The input file **2.3.3** is then transmitted to bus **240** and/or communication interface **4.0** for transmission to a particular application unit **270**.

FIG. **10** illustrates a detailed output data flow diagram for output module **3.0**. Output module **3.0** outputs a textual and/or image copy of the document. In the FIG. **1** preferred embodiment, output module **3.0** is implemented by printer **260**, associated software, and associated interface circuitry.

Operation

Examples of operation of a preferred embodiment will now be described.

The user enters the system by providing instructions to the information processing module **2.0**. The user then instructs the information processing module **2.0** to conduct maintain library processing, maintain definitions processing, or process document processing.

If the user selects maintain library processing, the user then provides instructions to maintain or modify the document library through the maintain library module **2.1**. For example, the user can direct the inputting and storage of a hard copy document **100** or can retrieve and output a document. The user requests inputting of a document through the store document module **2.1.1**. The system then prompts the user to specify a storage location for the inputted document. The document is then read in by the input process module **1.0**. A textual copy and/or an image copy are stored into the document file **2.1.4**. Errors which have occurred during inputting are identified and corrected by the correct errors module **2.1.2** and the user. The corrections are reflected in the document information stored in document file **2.1.4**.

The retrieve document module **2.1.3** is used to retrieve and output a document. The system prompts the user to specify the storage location of a document and the type of document copy, for example, a textual or an image copy, to be outputted. The document is then outputted by the output process module **3.0**.

If the user initially selected maintain definitions processing, the user would instruct the system to maintain and/or modify parameter definitions through the maintain definitions module **2.2**. For example, the user can define and maintain a document template for extracting selected portions of information off of the hard copy document. The user can use the template to extract selected portions of information off of the hard copy document when the document is originally inputted, or alternatively, the user can use the template to identify selected portions of information for extraction off of an image copy of the document. In creating the template, the user identifies pieces of information on the document to be extracted and assigns a variable name, or subf ile, to each piece of data.

The location of data to be extracted can be defined in a number of ways other than by use of a template. For example, the user can designate the absolute location of information on the document with respect to a grid overlaid on the document, e.g., always on line **3**, starting in column **1**. The user can also identify information by specifying the relative location of information to be extracted, e.g., always two lines below the piece of data named "salutation", starting in column **3**. The user can also specify the location of information to be extracted by variable location specification. For example, if the hard copy document is a letter, the module would conduct a key word search for the term "Dear Sir:". Wherever this term "Dear Sir:" is located, this piece of data wbuld be associated with the variable specified by the user, for example, the variable "salutation." In addition, a defined set of conventional symbols can be used to signify certain recurring data items for the convenience of users of the instant invention. For example, a "@" symbol can be used to delineate the vendor name as follows: "@XYZ Corporation@". Other examples of the use of symbols to delineate information will be described with reference to FIG. **14**.

The maintains definition module **2.2** is also used to maintain data relationships in accordance with content instructions and to maintain input file formats in accordance with transmission format instructions. Relationships are

defined and maintained between pieces of data, specified by, for example, the names of variables, through the define relationships module **2.2.2**. The names of pieces of data on the document are retrieved by, for example, the define template module **2.2.1**, and are passed to the define relationships module **2.2.2**. The user may then provide any additional pieces of data needed to generate an input file for a particular application program or unit, such as an input file line number. The user, the applications software, and/or instructions previously stored in memory then establishes the contents of the input file by defining relationships between pieces of data using content instructions. Specific examples of content instructions will be discussed below in conjunction with FIGS. **11**, **12A**, **12B**, **12C**, **13A**, **13B**, and **13C**.

The user and/or the applications software defines and maintains the transmission format of the input file to be used by a particular application program or unit through the define format module **2.2.3** in accordance with transmission format instructions. This is accomplished by defining the parameters to be used by the preapplication process module **2.3.2** in generating an input file. Parameters which would typically be required to generate an input file would include the character type, e.g., text or pixel; delimiters used between pieces of data, e.g., a slash or a semicolon; end of line characters, e.g., a carriage return or a line feed; and end of file characters. Examples of transmission formats will be described in further detail below in conjunction with FIGS. **11**, **12A**, **12B**, **12C**, **13A**, **13B**, and **13C**.

If the user initially selected process document processing, the interface will then proceed to process the document through use of the process document module **2.3**. For example, the user can extract specific portions of data from an image copy of a document, can generate an input file for transmission to an application program, or can directly process information interactively with an application program.

If the user desires to extract specific portions of data from an image copy of a hard copy document which has already been stored in memory, the user uses the extract data module **2.3.1** to identify a document to be processed. The document is then retrieved by the retrieve document module **2.1.3** and passed to the extract data module **2.3.1**. The user can also select parameter definitions through the select definitions module **2.2.4**.

The selected document template or parameter definition is passed to the extract data module **2.3.1**. The extract data module **2.3.1** extracts pieces of data from the image copy of the document, as defined by the document template definition or the parameter definitions or both. This document data is then passed to preapplication process module **2.3.2**.

The interface generates input file(s) **2.3.3** by use of the preapplication process module **2.3.2**. The selected data relationship definition, as defined by the content instructions, and the selected record format definitions, as defined by the transmission format instructions, are passed to the preapplication process module **2.3.2**. The preapplication process module **2.3.2** assembles the input file in accordance with the content instructions. The preapplication process module **2.3.2** also prompts the user for any additional pieces of data which need to be provided by the user. The input file is converted to the desired transmission format in accordance with the transmission format instructions. This physically formatted data is then stored in the input file **2.3.3**.

The user can also use an application program to process information by loading the particular application program into the computer **230** rather than by sending the input file to a remote application unit **270**.

An illustrative example of the processing described above will now be described.

The user inputs instructions via keyboard **234** or another input device which indicate that the user desires to input and store a document. The computer **230** then prompts the user for the name of the document. In this example, the user desires to input the document of FIG. **2** and therefore names the document "XYZ Corp. Bill **12/01/86**." The computer then prompts the user to feed the hard copy document **100** into the scanner **210**. The image of the hard copy document is displayed on display .**232**. The computer then prompts the user to identify the account number on the document. By use of the mouse **236** or other input device to position a cursor on the display, the user indicates the location of the account number. The account number is then read-in to a subfile named "Account Number." This process proceeds until all of the desired information has been read-in and stored.

In this particular example, no errors were encountered while inputting the document. The user then directs that the document be stored for future reference in a document file.

Some time later, the user desires to retrieve and output the document and to generate input files based on information from the document. The computer **230** prompts the user for the name of the document and the type of output. The user responds with "XYZ Corp. Bill **12/01/86**" for a printed textual copy. The document is then retrieved from the document file and passed to the printer **260** for printing.

In order to generate an input file for a specific application program, the user selects the option to define a document template for use when each month's XYZ Corporation bill arrives. Accordingly, the user instructs the system to display a copy of an XYZ Corporation bill on the display **232**. The user then identifies pieces of data by absolute locations. That is, the user assigns specific names to information located at specific portions of the document. In this example, the user would input the following information:

- Vendor-text, line **1**, one line, column **1**, 80 characters;
- Account number-numeric, line **6**, one line, column **25**, 9 characters;
- Statement date-date, line **9**, one line, column **25**, 8 characters;
- Payment date-date, line **11**, one line, column **25**, 8 characters;
- Previous balance-currency, line **7**, one line, column **75**, 9 characters;
- New charges-currency, line **8**, one line, column **75**, 9 characters;
- Other debits-currency, line **10**, one line, column **75**, 9 characters;
- Finance charges-currency, line **12**, one line, column **75**, 9 characters;
- Payments-currency, line **13**, one line, column **75**, 9 characters;
- Other credits-currency, line **14**, one line, column **75**, 9 characters;
- New balance-currency, line **15**, one line, column **75**, 9 characters.

The user also identifies data with variable locations. In this particular example, a variable location is specified as follows:

Heading **2**–line, value="Mail To:"

The identification of Heading **2** as line information means that the system will search for occurrences of the character

string "Mail To:" and assign the line number which contains this character string to Heading **2**.

The user also identifies data by relative locations. In this example, the user identifies the following relative location:

Mail To-text, Heading **2+1**, 3 lines, column **60**, 25 characters per line.

The instructions above instruct the system to assign the textual information beginning on one line after Heading **2** and continuing for 3 lines, in column **60**, to the Mail To subfile.

As an alternative to inputting the actual line, column, and character numbers, the user can identify desired portions of the document by blocking, or highlighting, the desired portions using the mouse or other input device. In this case, the computer converts the highlighted portions into corresponding line, column, and character numbers.

FIG. **11** lists data corresponding to the hard copy document of FIG. **2** and the associated variable or subfile names.

Next, the user desires to define data relationships in accordance with content instructions. Examples of the type of contents which can be specified by a user are illustrated in FIGS. **12A**, **12B**, and **12C**.

In this particular example., three separate departments of ABC Corporation require information from the XYZ Corporation bill. The first department requires vendor, account number, statement date, payment date, previous balance, new charges, debits, finance charges, payments, and new balance information. The second and third departments require mail to information and previous balance information. Each of these departments have their own application program which utilizes this information.

The user employs content instructions to designate how pieces of information, which have been extracted off of hard copy document **100**, are directed to particular departments, that is, particular application programs. FIG. **12A** illustrates the contents of the information to be transmitted to the first department. FIG. **12B** illustrates the information to be transmitted to the second department. FIG. **12C** illustrates the information to be transmitted to the third department. The content instructions, therefore, parse the information shown in FIG. **11** to various application programs, as shown by FIGS. **12A**, **12B**, and **12C**. Content instructions can also be used to identify additional pieces of data which are required for the input files of the particular application programs. In this particular example, the specific application programs from the three departments all require numeric record number information, numeric horizontal position information, numeric vertical position information, and date received information. The horizontal and vertical position information is used by the application program to specify the location of the received information on a spreadsheet application program, in this example. The user may know in advance the content format required by each application program, that is, in this example, the location and type of information specified on the spreadsheet. The user may also employ the split display mode described with reference to FIG. **3B** to generate content format instructions.

Using the content instructions, the user establishes the following contents for the input file corresponding to FIG. **12A**:

Record number, horizontal position, vertical position, vendor;

Record number, horizontal position, vertical position, account number;

Record number, horizontal position, vertical position, statement date;

Record number, horizontal position, vertical position, date received;

Record number, horizontal position, vertical position, payment date;

Record number, horizontal position, vertical position, previous balance;

Record number, horizontal position, vertical position, new charges;

Record number, horizontal position, vertical position, finance charges;

Record number, horizontal position, vertical position, payments;

Record number, horizontal position, vertical position, new balance.

Next, transmission format instructions are employed to define the transmission format of the input file for a specific application program or unit. FIG. **13A** illustrates the transmission input file corresponding to FIG. **12A**. FIG. **13B** illustrates the transmission input file corresponding to FIG. **12B**. FIG. **13C** illustrates the transmission input file corresponding to FIG. **12C**. A comparison of FIGS. **12B** and **12C** reveals that FIGS. **12B** and **12C** have the same contents. However, the information illustrated in FIG. **12B** is being sent to a different application program than the information in FIG. **12C**. These application programs require different transmission input formats as illustrated in FIGS. **13B** and **13C**. More specifically, the application program that receives the input file illustrated in FIG. **13B** uses the greater than sign as a delimiter whereas the application program which receives the transmission input file shown in FIG. **13C** uses a back-slash as the delimiter.

After the contents and the transmission format for the input file have been defined, and any additional information has been inputted, the input file is assembled and transmitted to the particular application program.

FIG. **14** illustrates another example of a hard copy document containing information to be processed by the instant invention. The hard copy document illustrated in FIG. **14** is first scanned and information from the hard copy document is stored into a memory. The interface **200** then identifies portions of the hard copy document corresponding to various variables by recognizing a defined set of symbols. In the FIG. **14** example, triangles delineate the mailing address, circles delineate the statement date, and squares delineate the new charges. Information from these portions of the hard copy document is stored in the corresponding memory locations or subfiles for each variable. The same set of symbols can be used to identify the same information from one document to the next. Thus, even if the physical formats of documents are not fixed from one document to the next, a diversity of hard copy documents can be processed without manually inputting data by recognition of the defined symbols.

Examples of readily available application programs are Quicken and Lotus **1,2,3** both of which are widely utilized in the business community. Quicken, for example is an easy-to-utilize program for writing checks and preparing business records. Payee, amount and address information may readily be transmitted from scanner memory **220** and/or main memory **250** to the Quicken application program for check writing functions and ledger keeping purposes. Lotus is a well known spreadsheet program which may process data input into specified cells once this data is placed in conventional Lotus format.

Thus, the instant invention provides an integrated and comprehensive system for handling information from a hard copy document, thus permitting a paperless office. In addition, the invention permits data, extracted off of a hard

copy document, to be easily manipulated into various logical and transmission formats required by a particular application unit. The invention also provides a low cost system for inputting information from a wide variety of hard copy documents into a memory.

The foregoing description has been set forth merely to illustrate preferred embodiments of the invention and is not intended to be limiting. Modifications are possible without departing from the scope of the invention.

For example, letters, checks, forms, pictures, reports, music scores, film, and other types of hard copy documents can be processed by the invention for accounts payable/receivable accounting, inventory control, record keeping, budgeting, data base management, music transcription, forms processing, computerized art, survey and questionnaire processing, statistical data analysis, correspondence processing and other applications.

Other automated digitizing units can be used in addition to or as an alternative to use of the scanner **210** as an input unit. Any electrical, magnetic, or optical device which extracts information off of a hard copy document, thereby eliminating the need to manually input significant amounts of information from the hard copy document is suitable for use as an automated digitizing unit. In addition, information can be input by user responses and digital and analog signals generated from various devices, and from computer files from other computer systems. Suitable hardware for inputting data includes a keyboard, a light pen, a mouse, a touch screen, a laser scanner, a microphone, a tablet, a disk drive, a magnetic tape drive, and a modem.

The interface **200** can also output information in forms other than a hard copy of textual or image information. For example, the interface **200** can output system responses, computer files, and digital and analog signals for transmission to other computer systems or to control systems. Suitable hardware for outputting information includes a disk drive, a magnetic tape drive, a cathode ray tube, a plasma screen, a printer, a plotter, a film developer, an amplifier, and a modem.

Since modifications of the described embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the scope of the invention should be limited solely with respect to the appended claims and equivalents.

What is claimed is:

1. A method of inputting information from a diversity of hard copy documents to a computer, comprising at least one of the following steps (a), (b), and (c):

(a) inputting information from a hard copy document according to an interactive mode which includes the following substeps

(a)(1) scanning a hard copy document and displaying a digitized image of at least a portion of the hard copy document on a display;

(a)(2) interactively receiving instructions from a user for identifying information on said digitized image and converting at least said identified information to converted text data corresponding to at least one field of information required by an application program; and

(a)(3) transferring said converted text data to said field of information;

(b) creating a template to enable transfer of converted text data corresponding to at least one field of information required by an application program according to an interactive template creation mode which includes the following substeps

(b)(1) scanning a hard copy document and displaying an image of at least a portion of the hard copy document on a display;

(b)(2) interactively receiving instructions from a user to create a template which identifies at least one location on said image as containing information to be converted to text data corresponding to a field of information required by an application program; and

(b)(3) storing said template;

(c) inputting information from a hard copy document according to an automatic mode which includes the following substeps

(c)(1) scanning a hard copy document to generate document information; and

(c)(2) matching at least a portion of said document information with a template created to transfer converted text data to at least one field of information required by an application program.

2. A method as set forth in claim **1**, further comprising the steps of:

defining a set of symbols which designate fields of information required by an application program; and

detecting the presence of a particular one of said defined set of symbols on a hard copy document and extracting a field of information required by an application program based on said detecting.

3. A method as set forth in claim **1**, further comprising the step of:

displaying a split-screen image showing at least a portion of said hard copy document and at least one field of information required by an application program during the interactive mode.

4. A method as set forth in claim **1**, further comprising the step of:

identifying said located information in step (a)(2) by blocking portions of said image on said display using an input device.

5. A method as set forth in claim **3**, further comprising the step of:

identifying said located information in step (a)(2) by blocking portions of said image on said display using an input device.

6. A method as set forth in claim **1**, further comprising the step of:

displaying a split-screen image showing at least a portion of said hard copy document and at least one field of information required by an application program during the interactive template creation mode.

7. A method as set forth in claim **1**, further comprising the step of:

creating a template in step (b)(2) by blocking portions of said image on said display using an input device.

8. A method as set forth in claim **6**, further comprising the step of:

creating a template in step (b)(2) by blocking portions of said image on said display using an input device.

9. A method as set forth in claim **1**, further comprising the step of:

storing a digitized image of a least a portion of a hard copy document in an image memory.

10. A method as set forth in claim **1**, further comprising the step of:

storing text data from the hard copy document in a text memory.

11. A method as set forth in claim **1**, further comprising the step of:

storing a digitized image of a least a portion of a hard copy document in an image memory; and

storing text data from the hard copy document in a text memory.

12. A method as set forth in claim **1**, further comprising the step of:

repeating substeps (a)(2) and (a)(3) at least once for other identified information and another field of information.

13. A method as set forth in claim **12**, further comprising the steps of repeating substeps (a)(2) and (a)(3) for another different application program.

14. A method as set forth in claim **1**, further comprising the steps of:

repeating substeps (a)(1), (a)(2) and (a)(3) for another different application program; and

creating another template for another different application program.

15. A method as set forth in claim **1**, further comprising the step of:

repeating substeps (c)(1) and (c)(2) for another different hard copy document.

16. A method as set forth in claim **1** wherein in step (b)(2) said template identifies a plurality of locations on said image on said display as containing a field of information required by an application program.

17. A method as set forth in claim **16**, further comprising the step of creating another template for another different application program.

18. A method as set forth in claim **1**, further comprising at least one of the steps of:

repeating substeps (a)(2) and (a)(3) for another different application program; and

creating another template for another different application program.

19. A method as set forth in claim **1**, further comprising the steps of repeating substeps (a)(1), (a)(2) and (a)(3) for another different application program.

20. A method of inputting information from a diversity of hard copy documents to a computer, comprising at least two of the following steps (a), (b), and (c):

(a) inputting information from a hard copy document according to an interactive mode which includes the following substeps

(a)(1) scanning a hard copy document and displaying a digitized image of at least a portion of the hard copy document on a display;

(a)(2) interactively receiving instructions from a user for identifying information on said digitized image and converting at least said identified information to converted text data corresponding to at least one field of information required by an application program; and

(a)(3) transferring said converted text data to said field of information;

(b) creating a template to enable transfer of converted text data corresponding to at least one field of information required by an application program according to an interactive template creation mode which includes the following substeps

(b)(1) scanning a hard copy document and displaying an image of at least a portion of the hard copy document on a display;

(b)(2) interactively receiving instructions from a user to create a template which identifies at least one location on said image as containing information to be converted to text data corresponding to a field of information required by an application program; and

(b)(3) storing said template;

(c) inputting information from a hard copy document according to an automatic mode which includes the following substeps

(c)(1) scanning a hard copy document to generate document information; and

(c)(2) matching at least a portion of said document information with a template created to transfer converted text data to at least one field of information required by an application program.

21. A method as set forth in claim **20**, further comprising the steps of:

defining a set of symbols which designate fields of information required by an application program; and

detecting the presence of a particular one of said defined set of symbols on a hard copy document and extracting a field of information required by an application program based on said detecting.

22. A method as set forth in claim **20**, further comprising the step of:

displaying a split-screen image showing at least a portion of said hard copy document and at least one field of information required by an application program during the interactive mode.

23. A method as set forth in claim **20**, further comprising the step of:

identifying said information in step (a)(2) by blocking portions of said image on said display using an input device.

24. A method as set forth in claim **22**, further comprising the step of:

identifying said information in step (a)(2) by blocking portions of said image on said display using an input device.

25. A method as set forth in claim **20**, further comprising the step of:

displaying a split-screen image showing at least a portion of said hard copy document and at least one field of information required by an application program during the interactive template creation mode.

26. A method as set forth in claim **20**, further comprising the step of:

creating a template in step (b)(2) by blocking portions of said image on said display using an input device.

27. A method as set forth in claim **25**, further comprising the step of:

creating a template in step (b)(2) by blocking portions of said image on said display using an input device.

28. A method as set forth in claim **20**, further comprising the step of:

storing a digitized image of at least a portion of a hard copy document in an image memory.

29. A method as set forth in claim **20**, further comprising the step of:

storing text data from the hard copy document in a text memory.

30. A method as set forth in claim **20**, further comprising the step of:

storing a digitized image of at least a portion of a hard copy document in an image memory; and

storing text data from the hard copy document in a text memory.

31. A method as set forth in claim **20**, further comprising the step of:

repeating substeps (a)(2) and (a)(3) at least once for other identified information and another field of information.

32. A method as set forth in claim 31, further comprising the steps of repeating substeps (a)(2) and (a)(3) for another different application program.

33. A method as set forth in claim 20, further comprising the steps of:

repeating substeps (a)(1), (a)(2) and (a)(3) for another different application program; and

creating another template for another different application program.

34. A method as set forth in claim 20, further comprising the step of:

repeating substeps (c)(1) and (c)(2) for another different hard copy document.

35. A method as set forth in claim 20, wherein in step (b)(2) said template identifies a plurality of locations on said image on said display as containing a field of information required by an application program.

36. A method as set forth in claim 20, further comprising the step of creating another template for another different application program.

37. A method as set forth in claim 20, further comprising the steps of:

repeating substeps (a)(2) and (a)(3) for another different application program; and

creating another template for another different application program.

38. A method as set forth in claim 20, further comprising the steps of repeating substeps (a)(1), (a)(2) and (a)(3) for another different application program.

39. A method as set forth in claim 20, further comprising at least two of the steps of:

(a) repeating substeps (a)(1), (a)(2) and (a)(3) at least once for another different hard copy document;

(b) repeating substeps (b)(1), (b)(2) and (b)(3) at least once for another different hard copy document; and

(c) repeating substeps (c)(1) and (c)(2) for another different hard copy document.

40. A method as recited in claim 39 wherein said at least two step are steps (a) and (b).

41. A method as recited in claim 39 wherein said at least two step are steps (a) and (c).

42. A method as recited in claim 39 wherein said at least two step are steps (b) and (c).

43. A method of inputting information from a diversity of hard copy documents to a computer, comprising each of the following steps (a), (b), and (c):

(a) inputting information from a hard copy document according to an interactive mode which includes the following substeps

(a)(1) scanning a hard copy document and displaying a digitized image of at least a portion of the hard copy document on a display;

(a)(2) interactively receiving instructions from a user for identifying information on said digitized image and converting at least said identified information to converted text data corresponding to at least one field of information required by an application program; and

(a)(3) transferring said converted text data to said field of information;

(b) creating a template to enable transfer of converted text data corresponding to at least one field of information required by an application program according to an interactive template creation mode which includes the following substeps

(b)(1) scanning a hard copy document and displaying an image of at least a portion of the hard copy document on a display;

(b)(2) interactively receiving instructions from a user to create a template which identifies at least one location on said image as containing information to be converted to text data corresponding to a field of information required by an application program; and

(b)(3) storing said template;

(c) inputting information from a hard copy document according to an automatic mode which includes the following substeps

(c)(1) scanning a hard copy document to generate document information; and

(c)(2) matching at least a portion of said document information with a template created to transfer converted text data to at least one field of information required by an application program.

44. A method as set forth in claim 43, further comprising the steps of:

defining a set of symbols which designate fields of information required by an application program; and

detecting the presence of a particular one of said defined set of symbols on a hard copy document and extracting a field of information required by an application program based on said detecting.

45. A method as set forth in claim 43, further comprising the step of:

displaying a split-screen image showing at least a portion of said hard copy document and at least one field of information required by an application program during the interactive mode.

46. A method as set forth in claim 43, further comprising the step of:

identifying said information in step (a)(2) by blocking portions of said image on said display using an input device.

47. A method as set forth in claim 45, further comprising the step of:

identifying said information in step (a)(2) by blocking portions of said image on said display using an input device.

48. A method as set forth in claim 43, further comprising the step of:

displaying a split-screen image showing at least a portion of said hard copy document and at least one field of information required by an application program during the interactive template creation mode.

49. A method as set forth in claim 43, further comprising the step of:

creating a template in step (b)(2) by blocking portions of said image on said display using an input device.

50. A method as set forth in claim 48, further comprising the step of:

creating a template in step (b)(2) by blocking portions of said image on said display using an input device.

51. A method as set forth in claim 43, further comprising the step of:

storing a digitized image of at least a portion of a hard copy document in an image memory.

52. A method as set forth in claim 43, further comprising the step of:

storing text data from the hard copy document in a text memory.

53. A method as set forth in claim 43, further comprising the step of:

storing a digitized image of at least a portion of a hard copy document in an image memory; and

storing text data from the hard copy document in a text memory.

54. A method as set forth in claim **43**, further comprising the step of:

repeating substeps (a)(2) and (a)(3) at least once for other identified information and another field of information.

55. A method as set forth in claim **54**, further comprising the steps of repeating substeps (a)(2) and (a)(3) for another different application program.

56. A method as set forth in claim **43**, further comprising the step of:

repeating substeps (a)(1), (a)(2) and (a)(3) for another different application program; and

creating another template for another different application program.

57. A method as set forth in claim **43**, further comprising the step of:

repeating substeps (c)(1) and (c)(2) for another different hard copy document.

58. A method as set forth in claim **43**, wherein in step (b)(2) said template identifies a plurality of locations on said image on said display as containing a field of information required by an application program.

59. A method as set forth in claim **43**, further comprising the step of creating another template for another different application program.

60. A method as set forth in claim **43**, further comprising the steps of:

repeating substeps (a)(2) and (a)(3) for another different application program; and

creating another template for another different application program.

61. A method as set forth in claim **1**, **20** or **43** further comprising at least one of the steps of:

(a) repeating substeps (a)(1), (a)(2) and (a)(3) at least once for another different hard copy document;

(b) repeating substeps (b)(1), (b)(2) and (b)(3) at least once for another different hard copy document; and

(c) repeating substeps (c)(1) and (c)(2) for another different hard copy document.

62. A method as set forth in claim **61** wherein said at least one step is step (a).

63. A method as set forth in claim **61** wherein said at least one step is step (b).

64. A method as set forth in claim **61** wherein said at least one step is step (c).

65. A method as set forth in claim **54**, further comprising the steps of repeating substeps (a)(1), (a)(2) and (a)(3) for another different application program.

66. A method as set forth in claim **43**, further comprising the steps of:

repeating substeps (a)(1), (a)(2) and (a)(3) at least once for another different hard copy document;

repeating substeps (b)(1), (b)(2) and (b)(3) at least once for another different hard copy document; and

repeating substeps (c)(1) and (c)(2) for another different hard copy document.

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